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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/748,051 12/22/00 ROSENBERG

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EXAMINER

WM01/1024

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BRIER, J

ART UNIT

PAPER NUMBER

2672

DATE MAILED:

10/24/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/748,051

Applicant(s)

ROSENBERG ET AL.

Examiner

Jeffery A. Brier

Art Unit

2672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on the prelim amendment filed on 12/22/00.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 82-112 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 82-85 and 97-112 is/are rejected.
- 7) ☒ Claim(s) 96 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. The preliminary amendments filed on 12/22/00 have been entered. Claims 1-81 were cancelled and claims 82-112 were added.

Drawings

2. The drawings are objected to because in figure 12 reference number 208 is pointing to transducer 214b instead of the ground member described on page 30 line 3. Correction is required.

Claim Objections

3. Claim 82 is objected to because of the following informalities: at line 9 detecting should be detect. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claim 99 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 99 is indefinite because at lines 10 and 11 "said manipulatable object" lacks antecedent basis in this claim because at line 1 of this claim applicant wrote "manipulable object".

Art Unit: 2672

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 102 and 103 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 102 claims: *A flexure linkage as recited in claim 99 wherein said second member is coupled to a ground, and further comprising a fourth member coupled to said third member and to ground, wherein flex is provided between said third member and said fourth member.* Thus claim 102/99 claim a second, third, and fourth members as being flexible and coupled to ground. The specification did not describe this. Figure 15 illustrates and pages 35 line 32 to page 36 line 24 describes three flexible members of the unitary member (212a, 212b, and either 212c or 212d). It is clear that the first, second, and third members correspond to members 216, 212a, and 212b and that the fourth member corresponds to 212d and that ground corresponds to 208. Thus claim 102 reads *A flexure linkage (212a, 212b, 212d) as recited in claim 99 wherein said second member (212b) is coupled to a ground (208), and further comprising a fourth member (212d) coupled to said third member (212b) and to ground(208), wherein flex is provided between said third member (212b) and said fourth member (212d). It is clear from figure 15 that third member 212b and fourth member 212d are not coupled together and to ground because element 216 couples 212a, 212b, and 212d to the user*

Art Unit: 2672

manipulatable member and because 212b and 212d are coupled to element 216 and because elements 212b and 212d are not couple to ground 208 but they are coupled instead to element 210b which is coupled to transducer and bearings 214a (described at page 33 lines 27-30).

Claim 103 depends upon claim 102 and is not supported for the reasons given for claim 102.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. The claims in this application are directed to the embodiment illustrated in figures 12-17 and 21C where members 212a-212d and 288a-288b of the unitary members flex.

9. Claims 82-92, 94, 95, 97, 99-101, and 104-112 are rejected under 35 U.S.C. 102(b) as being anticipated by Strandh, U.S. Patent No. 3,832,895.

Art Unit: 2672

Claim 82:

Strandh teaches an interface apparatus for interfacing motion of a user with a computer system (column 1 line 6-a machine includes computers since computers are machines-note the definition of computer given by American Heritage Dictionary, Microsoft Encarta Encyclopedia 99, Britannica 1999 Encyclopedia, World Book 1999 Encyclopedia, and Compton's 1999 Multimedia Encyclopedia and the definition of machine given by American Heritage Dictionary and World Book 1999 Encyclopedia all of which are attached to this office action), said interface apparatus comprising: a user manipulatable object (lever 6) physically contacted by said user and moveable by said user in at least two degrees of freedom (X and Y, column 3 lines 39-45); a linkage coupled to said user manipulatable object (14, 26, 15, 16, 6) and providing said at least two degrees of freedom to said user manipulatable object, said linkage including a plurality of members(14, 26, 15, 16, 6), wherein a selected number of said plurality of members are formed as a unitary member in which flex is provided between said selected number of members (14 and 15 flex); at least one sensor (Fig 1 17, 18, 19, 20 or Fig 2 17-24) able to detecting a position or motion of said user manipulatable object along said at least two degrees of freedom and outputting sensor signals, wherein said sensor signals, or a representation thereof, are received by said computer system (column 1 line 6).

Art Unit: 2672

Claim 83:

Strandh teaches an interface apparatus as recited in claim 82 further comprising an actuator (members 37 & 39 are connected to ground and cause an opposing force to be applied to members 14 & 15 when members 14 & 15 are flexed in response to the user moving lever 6) coupled to said linkage and able to apply a force along at least one of said at least two degrees of freedom to said user manipulatable object through said unitary member (the opposing force is felt by the user when the user moves lever 6).

Claim 84:

Strandh teaches an interface apparatus as recited in claim 82 wherein said linkage provides at least two revolute degrees of freedom (S_x and S_y , column 3 lines 39-45) to said user manipulatable object, each revolute degree of freedom being about an axis of rotation.

Claim 85:

Strandh teaches an interface apparatus as recited in claim 82 wherein said linkage provides at least two linear degrees of freedom (X and Y), each linear degree of freedom being along a linear axis.

Art Unit: 2672

Claim 86:

Strandh teaches an interface apparatus as recited in claim 82 wherein said plurality of members of said linkage are formed as a closed-loop linkage (the members 37, 14, 39, 26, 15, 16, 6 are fixed and integral to each other).

Claim 87:

Strandh teaches an interface apparatus as recited in claim 86 wherein said closed loop linkage includes four members (14, 15, 26, 16), wherein said four members of said closed-loop linkage are flexibly coupled to each other as segments of said unitary member.

Claim 88:

Strandh teaches an interface apparatus as recited in claim 87 wherein said closed loop linkage includes: a ground member coupled to a ground surface (the substrate forming tracts 28, 29, 30); first and second extension members (37,39), each extension member being coupled to said ground member; and first and second central members (14,15), said first central member having an end coupled to said first extension member (14,37) and said second central member having an end coupled to said second extension member (15,39), wherein said central members are coupled to each other at ends not coupled to said extension members (member 26) and wherein at least one of said central members is coupled to said user manipulatable object (lever 6).

Art Unit: 2672

Claim 89:

Strandh teaches an interface apparatus as recited in claim 88 wherein said central members are coupled to an object member (16) which is coupled to said user manipulatable object.

Claim 90:

Strandh teaches an interface apparatus as recited in claim 88 wherein said first and second central members are flexible (14, 15) and wherein said first and second central members and said first and second extension members are flexibly coupled (members 14 and 15 flex, thus they are flexibly connected to members 37 and 39) to each other and form said unitary member.

Claim 91:

Strandh teaches an interface apparatus as recited in claim 88 wherein said ground member is rotatably coupled to said first and second extension members by bearings (32, 33, 34).

Claim 92:

Strandh teaches an interface apparatus as recited in claim 86 wherein at least one of said members flexibly coupled in said unitary member is relatively narrow in a dimension in which said member is desired to flex (column 4 lines 27-34), and is

Art Unit: 2672

relatively wide in other dimensions in which said member is desired to be stiff(the wider faces prevent flexing in the z direction-column 3 lines 34-39 and column 4 lines 27-34).

Claim 94:

Strandh teaches an interface apparatus as recited in claim 88 wherein said central members are flexibly coupled to an object member (16) which is coupled to said user manipulatable object.

Claim 95:

Strandh teaches an interface apparatus as recited in claim 88 wherein said end of said first central member is flexibly coupled to said first extension member(member 14 is flexibly connected to carrier 37 because carrier 37 is connected to roller 32), and said end of said second central member is flexibly coupled to said second extension member (member 15 is flexibly connected to carrier 37 because carrier 37 is connected to roller 34).

Claim 97:

Strandh teaches an interface apparatus as recited in claim 82 wherein said user manipulatable object is a joystick handle (column 3 line 3).

Claim 99:

Strandh teaches a flexure linkage for providing motion to a user manipulable object (6) of an interface device, said interface device in communication with a computer system(column 1 line 6-a machine includes computers since computers are

Art Unit: 2672

machines), said flexure linkage comprising: a first member coupled to said user manipulatable object (16); a second member coupled to said first member (14), wherein flex is provided between said second member and said first member; and a third member (15) coupled to said first member, wherein flex is provided between said third member and said first member, and wherein said first, second and third members form a unitary member; wherein said flexure linkage provides at least two degrees of freedom (x and y) to said user manipulatable object with respect to a ground such that said user manipulatable object can be moved by a user in said at least two degrees of freedom (column 3 lines 39-45) and a position of said user manipulatable object in said two degrees of freedom can be provided to said computer system.

Claim 100:

Strandh teaches a flexure linkage as recited in claim 99 wherein said flexure linkage provides at least two revolute degrees of freedom (S_x and S_y , column 3 lines 39-45) to said user manipulatable object, each revolute degree of freedom being about an axis of rotation.

Claim 101:

Strandh teaches a flexure linkage as recited in claim 99 wherein said flexure linkage provides at least two linear degrees of freedom (X and Y), each linear degree of freedom being along a linear axis.

Art Unit: 2672

Claim 104:

Strandh teaches a flexure linkage as recited in claim 99 wherein said first and second members are coupled to an object member (16) which is coupled to said user manipulatable object.

Claim 105:

Strandh teaches a flexure linkage as recited in claim 99 wherein at least one of said members flexibly coupled in said unitary member is relatively narrow in a dimension in which said member is desired to flex (column 4 lines 27-34), and is relatively wide in other dimensions in which said member is desired to be stiff (member 15 is flexibly connected to carrier 37 because carrier 37 is connected to roller 34).

Claims 106, 108, 109, 110, 111, and 112 are similar to the above claims and are rejected for the reasons give above.

Claim 107:

Strandh teaches a method as recited in claim 106 further comprising applying a force along at least one of said at least two degrees of freedom to said user manipulatable object through said unitary member (the flexible members 14 and 15 would apply a force to the user when the user moves lever 6 due to spring like forces developed by the members when they bend).

Art Unit: 2672

10. Claims 82-84, 86-91, 93-95, 97, 99, 100, 104, 106-108, 110 and 112 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang, U.S. Patent No. 5,228,356.

On page 32 lines 14-19 of applicants specification applicant wrote

A major difference of the present embodiment from the embodiment of FIG. 2 is that members 210a, 210b, 212a and 212b can be provided as a "unitary member," where these four members are formed and produced coupled together as segments of a single part or "flexure." Gimbal mechanism 202 can thus also be considered a closed loop two member linkage, where one member is a complex unitary member (including these four segments) and the other member is ground member 208 that is rotatably coupled to the unitary member.

Thus, it is clear that unitary member includes parts assembled to be act as a unit.

On page 30 lines 26-33 of applicant specification applicant wrote:

Central member 212a is aligned parallel with a floating axis D and is made of a material such as flexible plastic, rubber, metal, or the like, that provides torsion flex (twist) and bending in a particular desired degree of freedom. Compliance or flex can also be provided with spring members and the like. Herein, the term "flex" is intended to refer to any sort of flexibility in a member or segment. Types of flex described herein include twist (torsion flex) and bending. Twist is the torque twisting motion about a member's lengthwise axis, and bending is the relative movement of the two ends of a member towards or away from each other.

Thus, it is clear that a spring may be a central member.

Claim 82:

Chang teaches an interface apparatus for interfacing motion of a user with a computer system (column 1 lines 5-8) said interface apparatus comprising: a user manipulatable object (handle 42) physically contacted by said user and moveable by said user in at least two degrees of freedom (50,52); a linkage coupled to said user

Art Unit: 2672

manipulatable object and providing said at least two degrees of freedom to said user manipulatable object, said linkage including a plurality of members (22, 24, 26a-26d, 28, 30, 31, 34), wherein a selected number of said plurality of members are formed as a unitary member (22, 24, 26a-26d) in which flex is provided between said selected number of members; at least one sensor (not shown, note column 1 lines 10-11) able to detecting a position or motion of said user manipulatable object along said at least two degrees of freedom and outputting sensor signals, wherein said sensor signals, or a representation thereof, are received by said computer system (column 1 lines 10-11).

Claim 83:

Chang teaches an interface apparatus as recited in claim 82 further comprising an actuator (stepper motor 34) coupled to said linkage and able to apply a force along at least one of said at least two degrees of freedom to said user manipulatable object through said unitary member (stepper motor moves the location of the springs which changes the force applied to the user through joystick 22 and handle 42).

Claim 84:

Chang teaches an interface apparatus as recited in claim 82 wherein said linkage provides at least two revolute degrees of freedom (joystick 22 rotates about ball 34) to said user manipulatable object, each revolute degree of freedom being about an axis of rotation.

Art Unit: 2672

Claim 86:

Chang teaches an interface apparatus as recited in claim 82 wherein said plurality of members of said linkage are formed as a closed-loop linkage (ball 24, joystick 22, springs 26a-26d, and bearings 31 comprise a closed loop).

Claim 87:

Chang teaches an interface apparatus as recited in claim 86 wherein said closed loop linkage includes four members(ball 24, joystick 22, springs 26a-26d, and bearings 31), wherein said four members of said closed-loop linkage are flexibly coupled to each other as segments of said unitary member.

Claim 88:

Chang teaches an interface apparatus as recited in claim 87 wherein said closed loop linkage includes: a ground member coupled to a ground surface(bearings 31 are supported by a base); first and second extension members, each extension member being coupled to said ground member (screws 30); and first and second central members (two of springs 26a-26d), said first central member having an end coupled to said first extension member (springs 26a-26d are each connected one of screws 30) and said second central member having an end coupled to said second extension member (springs 26a-26d are each connected one of screws 30), wherein said central members are coupled to each other at ends not coupled to said extension members (springs 26a-26d are connected to joystick 22) and wherein at

Art Unit: 2672

least one of said central members is coupled to said user manipulatable object (springs 26a-26d are connected to joystick 22 which is connected to handle 42).

Claim 89:

Chang teaches an interface apparatus as recited in claim 88 wherein said central members are coupled to an object member (springs 26a-26d are connected to joystick 22) which is coupled to said user manipulatable object (joystick 22 is connected to handle 42).

Claim 90;

Chang teaches an interface apparatus as recited in claim 88 wherein said first and second central members are flexible (springs 26a-26d are flexible) and wherein said first and second central members and said first and second extension members are flexibly coupled to each other and form said unitary member.

Claim 91;

Chang teaches an interface apparatus as recited in claim 88 wherein said ground member is rotatably coupled to said first and second extension members by bearings (bearings 31).

Art Unit: 2672

Claim 93:

Chang teaches an interface apparatus as recited in claim 83 wherein said actuator is a first actuator (first spring of four springs) coupled to a ground member (base which supports bearings 31), and further comprising a second actuator (second spring of four springs) coupled to a ground member of said linkage (base which supports bearings 31 and socket of ball 24), said second actuator being operative to apply a force in a degree of freedom to said user manipulatable object in response to signals received from said computer system (column 2 lines 15-19 & 28-33).

Claim 94:

Chang teaches an interface apparatus as recited in claim 88 wherein said central members are flexibly coupled to an object member which is coupled to said user manipulatable object (springs 26a-26d are flexibly coupled to joystick 22 which is coupled to handle 42).

Claim 95:

Chang teaches an interface apparatus as recited in claim 88 wherein said end of said first central member is flexibly coupled to said first extension member, and said end of said second central member is flexibly coupled to said second extension member (springs 26a-26d are flexibly coupled to screws 30).

Art Unit: 2672

Claim 97:

Chang teaches an interface apparatus as recited in claim 82 wherein said user manipulatable object is a joystick handle (column 2 lines 22-23).

Claims 99, 100, 104, 106-108, 110 and 112 are similar to the above rejected claims and are rejected under Chang for the same reason give above.

10-19-01
JB
11. Claims 82, 83, and 98 are rejected under 35 U.S.C. 102^e as being anticipated by ^{Salcudean} ~~Chang~~, U.S. Patent No. ^{5,790,108} ~~5,228,356~~.

Claim 82:

Salcudean teaches an interface apparatus for interfacing motion of a user with a computer system (figure 11, 200) said interface apparatus comprising: a user manipulatable object (handle 18) physically contacted by said user and moveable by said user in at least two degrees of freedom (column 3 line 55); a linkage coupled to said user manipulatable object and providing said at least two degrees of freedom to said user manipulatable object, said linkage including a plurality of members (16), wherein a selected number of said plurality of members are formed as a unitary member (16) in which flex (all elements have some flex) is provided between said selected number of members; at least one sensor (column 4 lines 31-39) able to detecting a position or motion of said user manipulatable object along said at least two degrees of freedom and outputting sensor signals, wherein said sensor signals, or a representation thereof, are received by said computer system (column 8 lines 47-51).

Claim 83:

Salcudean teaches an interface apparatus as recited in claim 82 further comprising an actuator (70,72, column 4 lines 42-67) coupled to said linkage and able to apply a force along at least one of said at least two degrees of freedom to said user manipulatable object through said unitary member (70, 72 on orthogonal sides of the handle 18 apply force in both the x and y directions).

Claim 98:

Salcudean teaches an interface apparatus as recited in claim 83 wherein said actuator includes a voice coil actuator (column 4 line 67) for imparting a force on said user object using magnetic fields and controlled by an electrical current.

Allowable Subject Matter

12. Claim 96 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter:

Claim 96/88/87/86/82 claims: An interface apparatus as recited in claim 88 wherein said two degrees of freedom are rotary degrees of freedom, each degree of freedom being about an axis of rotation, and wherein said two axes of rotation are fixed with respect to said ground member, said first and second extension members being

Art Unit: 2672

rotatable about said fixed axes of rotation, and wherein said central members are rotatable about first and second floating axes, said floating axes being movable with respect to said ground member. Referring to figure 12 it is seen that ground is 208, first and second extension members are 210a and 210b, first and second central members are 204 and 216, floating axis is D and E, and fixed axis are A and B. The prior art of record does not teach this claim.

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Marcus et al., U.S. Patent No. 6,004,134, Marshall et al., U.S. Patent No. 5,831,596, Lang, U.S. Patent No. 5,182,557, Matthews, U.S. Patent No. 4,794,388, and Roser et al., U.S. Patent No. 4,758,692, all teach linkages which have flex. Lang, U.S. Patent No. 5,182,557, and Marcus et al., U.S. Patent No. 6,004,134, additionally have computer controlled actuators causing force to be applied to the user manipulatable object.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffery A. Brier whose telephone number is (703) 305-4723. The examiner can normally be reached on M-F from 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi, can be reached at (703) 305-4713).

Art Unit: 2672

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks


Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.


Jeffery A Brier
Primary Examiner
Art Unit 2672